



Oregon

Theodore Kulongoski, Governor

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PDRSF 8.3.1
06/27/05

June 27, 2005

Eric Blischke & Chip Humphrey
EPA, Region 10
811 SW Sixth Avenue
Portland, Oregon 97204

JUN 20 2005

Kathy Ivy
EPA, Region 10
ECL-111
1200 Sixth Ave
Seattle, WA 98101

Re: Linnton Oil Fire Training Facility, Intersection of NW Marina Way & St Helens Road, Portland, Oregon
ECSI No. 1189 (River Mile 3.5)

Dear Eric, Chip, & Kathy:

The Oregon Department of Environmental Quality (DEQ) completed our review of site investigations conducted by the City of Portland Bureau of Environmental Services (BES) on the former Linnton Oil Fire Training facility located on the east bank of the Willamette River at approximately River Mile 3.5. The site is about 500 feet from the Willamette River. DEQ determined that the Linnton Oil Fire training facility does not appear to be a current or future source of contamination to the Willamette River, and no additional Source Control Evaluation or Source Control Actions are needed.

Please review our draft Source Control Decision supported by the attached memo and provide comments within 30-day of receipt of this letter (August 5, 2005). If you have any questions regarding DEQ's draft Source Control Decision for this facility, please contact me at 503-229-6825 or Tom Gainer, DEQ Project Engineer, at 503-229-5326.

Sincerely,

James M. Anderson, Manager
Portland Harbor Section

Attachments: 1) DEQ's June 20, 2005 File Memo

cc: Tom Gainer, DEQ/NWR

USEPA SF



1244925



State of Oregon
Department of Environmental Quality

Memorandum

To: ECSI File #1189

Date: June 20, 2005

From: Tom Gainer, Project Manager
Tom Roick, Peer Review



Subject: Portland Harbor Source Evaluation and
Proposed Conditional No Further Action
Linnton Oil Fire Training Facility
Portland, OR

The Oregon Department of Environmental Quality (DEQ) completed review of site investigations conducted by the City of Portland Bureau of Environmental Services (BES) on the former Linnton Oil Fire Training Grounds (LOFTG) Site located at the intersection of NW Marina Way and St. Helens Road approximately 1/2 mile north of the Linnton District of Portland (Figure 1). The site is about 500 feet from the Willamette River, and is located at approximately River Mile 3.5 within the Portland Harbor Superfund Site. Based on review of the documents, DEQ has determined that the LOFTG Site does not appear to be a current source of Portland Harbor river contamination. Because the LOFTG Facility does not appear to be a current source of Portland Harbor contamination, no additional investigation or source-control measures are necessary unless additional information becomes available in the future which indicates that the LOFTG Site is a current source of Portland Harbor contamination. Furthermore, DEQ proposes to issue a Conditional No Further Action (NFA) determination for the site.

Upland Site Background

The LOFTG property is owned by the Bonneville Power Administration (BPA) and serves as a right-of-way for high-tension power lines. Beginning in 1951, the City of Portland leased the property from BPA for fire training purposes. Fire Training operations occurred through 1988. During the oil fire training exercises, petroleum products were pumped to various props, ignited, and extinguished. The petroleum products were obtained from area businesses. Unburned products infiltrated into the ground or ran into a drainage ditch along the southern property boundary. The Remedial Investigation detected petroleum and chlorinated solvents in soil to 16 feet below ground surface. In addition, groundwater was also found to be contaminated with petroleum related compounds, pentachlorophenol (PCP), and chlorinated solvents.

A Remedial Investigation and Feasibility Study (RI/FS) was completed for the site in November 1995. In May 1996, the Director of DEQ signed a Record of Decision (ROD). Key elements of the identified remedy included:

- Treatment of petroleum contaminated soil through excavation and thermal desorption;
- Pretreatment of chlorinated solvent contaminated soil through biodegradation;

- On-site disposal of treated soils;
- Groundwater monitoring to confirm the effectiveness of the soil remedy; and,
- Institutional controls to prevent exposure to residual contamination.

In August 1996, an Intergovernmental Agreement was signed between DEQ and the City of Portland for implementation of the remedy. The Remedial Action was implemented in 1998 whereby the majority of contaminated soil above a depth of 8 feet was removed (Figure 2), treated and replaced at the site. Semi-annual groundwater monitoring of 12 wells (Figure 2) was conducted from November 1999 through October 2004 to assess the effectiveness of the remedy and attenuation of groundwater contaminant concentrations. Institutional controls restricting subsurface excavation and groundwater use were established on August 11, 2003 to ensure that the remedy remains protective.

DEQ recently completed review of two potential contaminant pathways to the Willamette River: groundwater and surface water (i.e., storm water).

Groundwater Pathway

Depth to groundwater ranges from about 2 to 21 feet below ground surface and flow is northeast towards the Willamette River (Figure 2). Based on groundwater monitoring results conducted at the subject site (Tables 1-4 and Figures 3-6) and trend analyses presented in the Five-Year Review Report, DEQ has determined that groundwater contaminant plumes are generally stable or decreasing in size and concentration. The leading edge of the plume is over 600 feet from the Willamette River and does not appear to be advancing towards the river (Figure 7 shows location of downgradient monitoring wells relative to the Willamette River). The deed restriction prevents human exposure to site groundwater. Therefore, the remedy described in the ROD has been successfully implemented.

Groundwater constituents that exceeded human health-based screening levels in the October 2004 monitoring event include: PCP, benzene, vinyl chloride, 1,1-dichloroethene, and arsenic. Screening for ecological receptors is not appropriate since the plume is stable and a significant distance from the Willamette River. Lack of migration and continued natural attenuation of contaminants will be confirmed by annual groundwater monitoring with five-year reviews.

Surface Water Pathway

Discovery of a surface water drainage culvert from the subject site on to the adjacent undeveloped BPA property prompted an investigation in 2003-2004 of the surface water drainage pathway to the Willamette River. BES submitted analytical results for 16 soil samples collected along the drainage pathway (Table 5 and Figure 7), which showed that the contaminant distribution of PCP and polycyclic aromatic hydrocarbons (PAHs) along the surface water pathway is limited in extent and was adequately defined.

Of the four soil samples collected in the vicinity of the surface water pathway discharge to the Willamette River, only one sample slightly exceeded the Portland Harbor 1 mg/kg Probable Effects Concentration (PEC) sediment screening level for PCP at a concentration of 1.08 mg/kg and the bioaccumulation sediment screening level of 0.37 mg/kg. PCP was not detected in an adjacent sample, or in samples located immediately upstream within the drainage ditch and downstream at the river waterline. While several other soil samples exceeded the sediment bioaccumulation screening levels for PCP and benzo(a)pyrene, they are located about 1,000 feet from the river and significant transport in this diffuse drainage pathway is not expected. These data indicate that there does not appear to be a significant current source of PCP near the Willamette River that exceeds the toxicity and bioaccumulation screening levels. Only one of the 16 soil samples exceeded the PCP screening levels for terrestrial ecological receptors or residential human receptors. Therefore, PCP generally does not appear to pose significant risk to these potential receptors.

All detected PAH concentrations were significantly less than the Portland Harbor PEC and terrestrial ecological screening levels.

Conclusions

Based on review of the file, DEQ has made the following conclusions:

1. **Groundwater:** Contaminant plumes at the subject site are generally stable or decreasing in size and concentration. The leading edge of the plume is over 600 feet from the Willamette River and does not appear to be advancing towards the river. The deed restriction prevents human exposure to site groundwater. Therefore, the remedy described in the ROD has been successfully implemented.
2. **Surface Water:** Soil analyses indicate a complete pathway from the site towards the river, but residual PCP concentrations are below screening levels and source control measures are not necessary at this time.
3. The upland site does not appear to be a current source of contamination to the Willamette River.

Recommendations

- Submit this site for US EPA and trustee review in the Portland Harbor program.
- Issue a conditional NFA letter for the upland subject site, with the conditions being annual groundwater monitoring and continued maintenance of the deed restriction.

Project Submittals

Surface Water Pathway Soil Results, January 26, 2004 and August 2, 2004

Semi-Annual Groundwater Monitoring Reports, 1999 to 2004

Five-Year Review Report, April 15, 2005

Attachments: Five Tables
Seven Figures

Table 41

Total Petroleum Hydrocarbons Detected in Groundwater
 Linnton Oil Fire Training Grounds
 Portland, Oregon

Well Number & Sample Date	Northwest Test Method (NWTPH)								EPA Method 8015M (mg/L)		EPA Method 418.1 (mg/L)
	HCID (mg/L)			GC (mg/L)	ID (mg/L)						
	Gas	Diesel	Heavy Oil	Gas	Chuel Oil	Diesel	Kerosene	Heavy Oil/Motor Oil	Gas	Diesel	Heavy Oil
<u>MW-1</u>											
Jun-93	--	--	--	--	--	--	--	--	<1.0	<2.5	NA
Dec-93	--	--	--	--	--	--	--	--	<1.0	<2.5	NA
Nov-99	<0.25	DET	DET	0.12	--	<0.25	--	<0.500	--	--	--
Apr-00	<0.25	DET	<0.63	NA	--	2.68	--	1.00	--	--	--
Oct-00	<0.25	DET	DET	NA	--	3.33	--	0.637	--	--	--
Oct-00 (Dup)	<0.25	DET	DET	NA	--	3.55	--	0.686	--	--	--
Apr-01	NR	NR	NR	0.165	--	4.82	--	1.25	--	--	--
Oct-01	NR	NR	NR	0.148	--	5.61	--	1.14	--	--	--
Apr-02	NR	NR	NR	0.169	--	4.05	--	0.898	--	--	--
Oct-02	NA	NA	NA	<0.08	--	4.90	--	<0.500	--	--	--
Apr-03	NA	NA	NA	0.218	--	3.13	--	<0.500	--	--	--
Oct-03	NA	NA	NA	<0.08	--	2.47	--	<0.500	--	--	--
Apr-04	NA	NA	NA	0.0881	--	2.98	--	0.793	--	--	--
Oct-04	NA	NA	NA	<0.08	<2.00	5.64	<1.00	<2.00	--	--	--
<u>MW-2</u>											
Jun-93	--	--	--	--	--	--	--	--	3.0	<2.5	NA
Jun-93 (Dup)	--	--	--	--	--	--	--	--	4.1	2.8	NA
Dec-93	--	--	--	--	--	--	--	--	<1.0	<2.5	NA
Dec-93 (Dup)	--	--	--	--	--	--	--	--	<1.0	<2.5	NA
Nov-99	DET	DET	<0.63	1.94	--	1.71	--	<0.500	--	--	--
Apr-00	DET	DET	<0.63	3.86	--	2.52	--	<0.500	--	--	--
Oct-00	DET	DET	<0.63	1.51	--	NA	--	NA	--	--	--
Apr-01	NR	NR	NR	3.45	--	5.12	--	<0.500	--	--	--
Oct-01	NR	NR	NR	1.1	--	4.11	--	<0.500	--	--	--
Apr-02	NR	NR	NR	2.07	--	6.01	--	0.516	--	--	--
Oct-02	NA	NA	NA	1.61	--	3.61	--	<0.500	--	--	--
Apr-03	NA	NA	NA	1.47	--	2.39	--	<0.500	--	--	--
Apr-03 (Dup)	NA	NA	NA	1.51	--	2.20	--	<0.500	--	--	--
Oct-03	NA	NA	NA	1.75	--	2.56	--	<0.500	--	--	--
Apr-04	NA	NA	NA	2.17	--	6.34	--	0.539	--	--	--
Oct-04	NA	NA	NA	1.42	<2.00	3.04	<1.00	<2.00	--	--	--
<u>MW-4</u>											
Oct-04	NA	NA	NA	<0.08	<0.500	0.251	<0.250	<0.500	--	--	--

Table 1
Total Petroleum Hydrocarbons Detected in Groundwater
Linnton Oil Fire Training Grounds
Portland, Oregon

Well Number & Sample Date	Northwest Test Methods (NWTM)								EPA Method 8015M (mg/L)		EPA Method 418.1 (mg/L)
	HCB (mg/L)			Cx (mg/L)	Dx (mg/L)						
	Gas	Diesel	Heavy Oil		Gas	Diesel	Kerosene	Heavy Oil/Motor Oil	Gas	Diesel	Heavy Oil
<u>MW-5</u>											
Jun-93	--	--	--	--	--	--	--	--	<1.0	<2.5	NA
Dec-93	--	--	--	--	--	--	--	--	<1.0	<2.5	NA
Nov-99	<0.25	DET	DET	<0.08	--	<0.25	--	<0.500	--	--	--
Apr-00	<0.25	DET	<0.63	NA	--	2	--	0.81	--	--	--
Oct-00	<0.25	DET	DET	NA	--	1.71	--	<0.500	--	--	--
Apr-01	NR	NR	NR	<0.08	--	2.66	--	0.717	--	--	--
Oct-01	NR	NR	NR	0.084	--	1.84	--	<0.500	--	--	--
Oct-01 (Dup)	NR	NR	NR	NR	--	1.95	--	0.708	--	--	--
Apr-02	NR	NR	NR	<0.08	--	2.44	--	0.556	--	--	--
Oct-02	NR	NR	NR	<0.08	--	2.26	--	<0.500	--	--	--
Oct-02 (Dup)	NA	NA	NA	<0.08	--	2.43	--	<0.500	--	--	--
Apr-03	NA	NA	NA	0.0913	--	2.72	--	<0.500	--	--	--
Oct-03	NA	NA	NA	<0.08	--	1.58	--	<0.500	--	--	--
Apr-04	NA	NA	NA	<0.08	--	1.44	--	<0.500	--	--	--
Oct-04	NA	NA	NA	<0.80	<2.00	3.08	<1.00	<2.00	--	--	--
Oct-04 (Dup)	NA	NA	NA	<0.80	<2.00	3.15	<1.00	<2.00	--	--	--
<u>MW-7</u>											
Oct-04	NA	NA	NA	<0.80	<0.500	0.666	<0.250	<0.250	--	--	--
<u>MW-8</u>											
Oct-04	NA	NA	NA	0.112	<0.500	7.61	<2.50	<5.00	--	--	--
<u>MW-9</u>											
Jun-93	--	--	--	--	--	--	--	--	<1.0	<2.5	NA
Dec-93	--	--	--	--	--	--	--	--	<1.0	<2.5	NA
Nov-99	<0.25	DET	DET	<0.08	--	<0.25	--	<0.500	--	--	--
Apr-00	<0.25	DET	<0.63	NA	--	2.3	--	0.61	--	--	--
Oct-00	<0.25	DET	DET	NA	--	3.81	--	0.557	--	--	--
Apr-01	NR	NR	NR	<0.08	--	4.08	--	0.700	--	--	--
Oct-01	NR	NR	NR	<0.08	--	2.69	--	<0.500	--	--	--
Apr-02	NR	NR	NR	<0.08	--	6.08	--	1.80	--	--	--
Apr-02 (Dup)	NR	NR	NR	<0.08	--	6.04	--	1.81	--	--	--
Oct-02	NA	NA	NA	NA	--	3.24	--	<0.500	--	--	--
Apr-03	NA	NA	NA	NA	--	0.684	--	<0.500	--	--	--
Oct-03	NA	NA	NA	NA	--	2.26	--	<0.500	--	--	--
Apr-04	NA	NA	NA	NA	--	2.94	--	0.811	--	--	--
Oct-04	NA	NA	NA	<0.80	<2.00	3.83	<1.00	<2.00	--	--	--

Table 41

Total Petroleum Hydrocarbons Detected in Groundwater
 Linnton Oil Fire Training Grounds
 Portland, Oregon

Well Number & Sample Date	Northwest Test Methods (NWTPH)								EPA Method 8015M (mg/L)		EPA Method 418.1 (mg/L)
	HCID (mg/L)			Gx (mg/L)	Dx (mg/L)						
	Gas	Diesel	Heavy Oil	Gas	6 Fuel Oil	Diesel	Kerosene	Heavy Oil/Motor Oil	Gas	Diesel	Heavy Oil
<u>MW-10</u>											
Dec-93	--	--	--	--	--	--	--	--	<1.0	<2.5	NA
Apr-01	NR	NR	NR	<0.08	--	3.99	--	0.753	--	--	--
Oct-01	NR	NR	NR	<0.08	--	2.97	--	0.638	--	--	--
Apr-02	NR	NR	NR	<0.08	--	1.46	--	0.661	--	--	--
Oct-02	NA	NA	NA	NA	--	0.827	--	<0.500	--	--	--
Apr-03	NA	NA	NA	NA	--	1.83	--	<0.500	--	--	--
Oct-03	NA	NA	NA	NA	--	0.315	--	<0.500	--	--	--
Apr-04	NA	NA	NA	NA	--	0.461	--	<0.500	--	--	--
Oct-04	NA	NA	NA	<0.80	<0.500	0.768	<0.250	<0.500	--	--	--
<u>MW-11</u>											
Oct-04	NA	NA	NA	<0.80	<0.500	<0.250	<0.250	<0.500	--	--	--
<u>MW-12</u>											
Oct-04	NA	NA	NA	<0.80	<0.500	<0.250	<0.250	<0.500	--	--	--
<u>MW-13</u>											
Nov-99	<0.25	DET	DET	0.38	--	0.75	--	<0.500	--	--	--
Apr-00	<0.25	DET	<0.63	NA	--	7.12	--	<0.500	--	--	--
Oct-00	<0.25	DET	DET	NA	--	11.8	--	1.38	--	--	--
Apr-01	NR	NR	NR	0.178	--	9.09	--	1.06	--	--	--
Oct-01	NR	NR	NR	0.165	--	11.1	--	2.19	--	--	--
Apr-02	NR	NR	NR	0.312	--	8.37	--	1.69	--	--	--
Oct-02	NA	NA	NA	0.104	--	9.4	--	<0.500	--	--	--
Apr-03	NA	NA	NA	0.283	--	6.46	--	<0.500	--	--	--
Oct-03	NA	NA	NA	<0.08	--	6.78	--	<0.500	--	--	--
Oct-03 (DUP)	NA	NA	NA	<0.08	--	7.58	--	<0.500	--	--	--
Apr-04	NA	NA	NA	0.332	--	4.95	--	0.91	--	--	--
Apr-04 (DUP)	NA	NA	NA	0.383	--	3.61	--	0.548	--	--	--
Oct-04	NA	NA	NA	<0.80	<5.00	11.5	<2.50	<5.00	--	--	--
<u>MW-14</u>											
Nov-99	<0.25	<0.63	<0.63	<0.08	--	0.32	--	<0.500	--	--	--
Nov-99 (Dup)	<0.25	<0.63	<0.63	<0.08	--	0.32	--	<0.500	--	--	--
Apr-00	<0.25	<0.63	<0.63	NA	--	NA	--	NA	--	--	--
Apr-00 (Dup)	<0.25	<0.63	<0.63	NA	--	NA	--	NA	--	--	--
Oct-00	<0.25	<0.63	<0.63	NA	--	NA	--	NA	--	--	--
Apr-01	NR	NR	NR	0.0854	--	0.767	--	<0.500	--	--	--
Apr-01 (Dup)	NR	NR	NR	<0.08	--	0.724	--	<0.500	--	--	--
Oct-01	NR	NR	NR	<0.08	--	0.541	--	<0.500	--	--	--
Apr-02	NR	NR	NR	<0.08	--	<0.250	--	<0.500	--	--	--
Oct-02	NA	NA	NA	NA	--	0.474	--	<0.500	--	--	--
Apr-03	NA	NA	NA	NA	--	<0.250	--	<0.500	--	--	--
Oct-04	NA	NA	NA	NA	--	<0.250	--	<0.500	--	--	--
Apr-04	NA	NA	NA	NA	--	<0.250	--	<0.500	--	--	--
Oct-04	NA	NA	NA	<0.80	<0.500	0.669	<0.250	<0.500	--	--	--

Table 1

Total Petroleum Hydrocarbons Detected in Groundwater
Linnton Oil Fire Training Grounds
Portland, Oregon

Notes:

Dup	Duplicate Sample
mg/L	Milligrams per liter
<	Indicates less than the method reporting limit
NA	Not analyzed
NR	Requested on Chain of Custody - results not reported
DET	Detected

Table 2

Semivolatile Organic Compounds Detected in Groundwater

Linnton Oil Fire Training Grounds

Portland, Oregon

Well Number	Sample Date	Compound concentration in µg/L										
		Acenaphthene	Anthracene	Fluoranthene	Fluorene	Naphthalene	Phenanthrene	Pyrene	Benzo(a)anthracene	Benzo(a)pyrene	Chrysene	Pentachlorophenol
Cleanup Criteria	RBC	b	b	b	b	b	b	b	0.028 ^c	0.02 ^c	0.032 ^c	b
Screening Level Values	WQCS (acute/chronic)	1,700/520	b	3,980/NV	b	2,300/620	b	b	b	b	b	20/13
	MCL	b	b	b	b	b	b	b	b	0.2	b	1.00
	PRG	370	1800	1500	240	6.2	b	180	b	0.0092	9.2	0.56
MW-1	Nov-99	<1.0	<1.0	<0.1	<1.0	<1.0	<0.1	<0.1	<0.1	<0.1	<0.1	NA
	Apr-00	<1.0	<1.0	<0.1	<0.1	<1.0	<0.1	<0.1	<0.1	<0.1	<0.1	NA
	Oct-00	<0.2	<0.2	<0.2	0.23	<1.0	<0.2	<0.2	<0.2	<0.2	<0.2	<2.0
	Oct-00(Dup)	<0.2	<0.2	<0.2	<1.0	<1.0	<0.2	<0.2	<0.2	<0.2	<0.2	<2.0
	Apr-01	d	d	d	d	d	d	d	d	d	d	<2.0 ^e
	Oct-01	d	d	d	d	d	d	d	d	d	d	<1.0
	Apr-02	d	d	d	d	d	d	d	d	d	d	<1.0
	Oct-02	d	d	d	d	d	d	d	d	d	d	d
	Oct-04	<0.10	<0.10	<0.10	<0.10	<0.10	0.150	<0.10	<0.10	<0.10	<0.10	<1.0

Table 2

Semivolatile Organic Compounds Detected in Groundwater
 Linnton Oil Fire Training Grounds
 Portland, Oregon

Well Number	Sample Date	Compound concentration in µg/l										
		Acenaphthene	Anthracene	Fluoranthene	Fluorene	Naphthalene	Phenanthrene	Pyrene	Benzo(a)anthracene	Benzo(a)pyrene	Chrysene	Pentachlorophenol
Cleanup Criteria	RBC	b	b	b	b	b	b	b	0.028 ^c	0.02 ^c	0.032 ^c	b
Screening Level Values	WQCS (acute/chronic)	1,700/520	b	3,980/NV	b	2,300/620	b	b	b	b	b	20/13
	MCL	b	b	b	b	b	b	b	b	0.2	b	1.00
	PRG	370	1800	1500	240	6.2	b	180	b	0.0092	9.2	0.56
MW-2	Jul-93	4.2	2.3	3.7	4.6	83.0	4.6	1.3	0.9	0.2	0.2	NA
	Dec-93	5.1	3.4	11.0	8.1	13.0	7.1	2.7	0.8	0.5	0.6	NA
	Dec-93 (Dup)	8.4	2.0	6.1	11.0	21.0	6.2	2.5	1.2	0.5	0.7	NA
	Nov-99	4.42	0.384	<2.0	3.42	17.80	1.81	<0.1	<0.1	<0.1	<0.1	NA
	Apr-00	3.21	0.376	<0.1	3.64	42.40	1.96	<0.1	<0.1	<0.1	<0.1	NA
	Oct-00	6.35	0.846	0.514	7.00	12.0	4.79	<0.5	<0.5	<0.5	<0.5	<5.0
	Apr-01	5.47	0.908	0.503	5.76	41.10	2.84	0.50	0.150	<0.1	0.162	<1.0
	Oct-01	3.81	1.170	0.772	3.81	<1.5	3.31	0.754	0.203	<0.1	0.215	<1.0
	Apr-02	1.29	0.447	0.296	2.59	9.39	0.869	0.261	<0.1	<0.1	<0.1	<1.0
	Oct-02	3.73	0.719	0.542	4.26	5.65	2.450	0.568	0.160	<0.1	0.147	<1.0
	Apr-03	1.71	0.313	0.131	3.21	6.02	1.45	0.181	<0.1	<0.1	<0.1	d
	Apr-03 (Dup)	1.70	0.344	<0.100	3.28	4.72	1.99	0.151	<0.1	<0.1	<0.1	d
	Oct-03	5.14	0.738	0.448	5.65	3.92	3.34	0.397	<0.2	<0.2	<0.2	d
	Apr-04	1.70	0.426	0.227	3.44	8.41	1.90	0.189	<0.1	<0.1	<0.1	d
	Oct-04	3.96	0.597	0.296	5.18	0.591	2.37	0.201	<0.10	<0.10	<0.10	<1.0
MW-4	Oct-04	<0.10	<0.10	<0.10	<0.10	<0.10	0.132	<0.10	<0.10	<0.10	<0.10	<1.0

Table 2

Semivolatile Organic Compounds Detected in Groundwater
 Linnton Oil Fire Training Grounds
 Portland, Oregon

Well Number	Sample Date	Compound Concentration in µg/L										
		Acenaphthene	Anthracene	Fluoranthene	Fluorene	Naphthalene	Phenanthrene	Pyrene	Benzo(a)anthracene	Benzo(a)pyrene	Chrysene	Pentachlorophenol
Cleanup Criteria	RBC	b	b	b	b	b	b	b	0.028 ^c	0.02 ^c	0.032 ^c	b
Screening Level Values	WQCS (acute/chronic)	1,700/520	b	3,980/NV	b	2,300/620	b	b	b	b	b	20/13
	MCL	b	b	b	b	b	b	b	b	0.2	b	1.00
	PRG	370	1800	1500	240	6.2	b	180	b	0.0092	9.2	0.56
MW-5	Nov-99	<0.1	0.257	<0.1	<0.1	<0.5	<0.1	0.147	<0.1	<0.1	<0.1	NA
	Apr-00	<0.5	0.365	0.3	1.1	<1.0	<0.1	0.222	<0.1	<0.1	<0.1	NA
	Oct-00	<0.1	<2.0	0.16	<2.0	<2.0	<2.0	0.284	<0.1	<0.1	<0.1	6.25
	Apr-01	d	d	d	d	d	d	d	d	d	d	1.85 ^e
	Oct-01	d	d	d	d	d	d	d	d	d	d	247
	Apr-02	d	d	d	d	d	d	d	d	d	d	<1.0
	Oct-02	d	d	d	d	d	d	d	d	d	d	9.18
	Apr-03	d	d	d	d	d	d	d	d	d	d	<2.0
	Oct-03	d	d	d	d	d	d	d	d	d	d	5.64
	Apr-04	d	d	d	d	d	d	d	d	d	d	<1.0
	Oct-04	<0.10	0.123	<0.10	<0.10	<0.10	0.150	0.166	<0.10	<0.10	<0.10	4.91
	Oct-04 (Dup)	<0.10	0.114	<0.10	<0.10	<0.10	0.130	0.179	<0.10	<0.10	<0.10	3.83
MW-7 ^g	Apr-02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<1.0
	Oct-02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<1.0
	Apr-03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	d
	Oct-04	<0.10	<0.10	<0.10	<0.10	<0.10	0.118	<0.10	<0.10	<0.10	<0.10	<1.0

Table 2

Semivolatile Organic Compounds Detected in Groundwater
 Linnton Oil Fire Training Grounds
 Portland, Oregon

Compound concentration in µg/L												
Well Number	Sample Date	Acenaphthene	Anthracene	Fluoranthene	Phorene	Naphthalene	Phenanthrene	Pyrene	Benzo(a)anthracene	Benzo(a)pyrene	Chrysene	Pentachlorophenol
Cleanup Criteria	RBC	b	b	b	b	b	b	b	0.028 ^c	0.02 ^c	0.032 ^c	b
Screening Level Values	WQCS (acute/chronic)	1,700/520	b	3,980/NV	b	2,300/620	b	b	b	b	b	20/13
	MCL	b	b	b	b	b	b	b	b	0.2	b	1.00
	PRG	370	1800	1500	240	6.2	b	180	b	0.0092	9.2	0.56
MW-8 ^g	Apr-02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<1.0
	Oct-02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<1.0
	Apr-03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	d
	Oct-04	0.550	<0.10	<0.10	0.544	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<1.0
MW-9	Nov-99	<1.0	<1.0	<0.1	<1.0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
	Apr-00	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
	Oct-00	<0.2	<0.2	<0.2	<0.2	<1.0	<0.2	<0.2	<0.2	<0.2	<0.2	8.93
	Apr-01	d	d	d	d	d	d	d	d	d	d	7.11 ^e
	Oct-01	d	d	d	d	d	d	d	d	d	d	2.12
	Apr-02	d	d	d	d	d	d	d	d	d	d	<2.0
	Oct-02	d	d	d	d	d	d	d	d	d	d	2.35
	Apr-03	d	d	d	d	d	d	d	d	d	d	7.05
	Oct-03	d	d	d	d	d	d	d	d	d	d	<1.0
	Apr-04	d	d	d	d	d	d	d	d	d	d	<1.0
	Oct-04	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<1.0

Table 2
Semivolatile Organic Compounds Detected in Groundwater
Linnton Oil Fire Training Grounds
Portland, Oregon

Well Number	Sample Date	Compound concentration in µg/l										
		Acenaphthene	Anthracene	Fluoranthene	Fluorene	Naphthalene	Phenanthrene	Pyrene	Benzo(a)anthracene	Benzo(a)pyrene	Chrysene	Pentachlorophenol
Cleanup Criteria	RBC	b	b	b	b	b	b	b	0.028 ^c	0.02 ^c	0.032 ^c	b
Screening Level Values	WQCS (acute/chronic)	1,700/520	b	3,980/NV	b	2,300/620	b	b	b	b	b	20/13
	MCL	b	b	b	b	b	b	b	b	0.2	b	1.00
	PRG	370	1800	1500	240	6.2	b	180	b	0.0092	9.2	0.56
MW-10 ^f	Dec-93	<0.5	<0.05	<0.1	<0.1	<0.5	<0.05	<0.1	<0.1	0.1	>0.1	NA
	Apr-01	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	21.40
	Oct-01	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	11.80
	Apr-02	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	7.80
	Oct-02	d	d	d	d	d	d	d	d	d	d	7.58
	Apr-03	d	d	d	d	d	d	d	d	d	d	2.57
	Oct-03	d	d	d	d	d	d	d	d	d	d	3.41
	Apr-04	d	d	d	d	d	d	d	d	d	d	9.86
MW-11	Oct-04	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<1.0
	Oct-04	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<1.0

Table 2

Semivolatile Organic Compounds Detected in Groundwater
 Linnton Oil Fire Training Grounds
 Portland, Oregon

		Compound concentration in µg/l										
Well Number	Sample Date	Acenaphthene	Anthracene	Fluoranthene	Fluorene	Naphthalene	Phenanthrene	Pyrene	Benzo(a)anthracene	Benzo(a)pyrene	Chrysene	Pentachlorophenol
Cleanup Criteria	RBC	b	b	b	b	b	b	b	0.028 ^c	0.02 ^c	0.032 ^c	b
Screening Level Values	WQCS (acute/chronic)	1,700/520	b	3,980/NV	b	2,300/620	b	b	b	b	b	20/13
	MCL	b	b	b	b	b	b	b	b	0.2	b	1.00
	PRG	370	1800	1500	240	6.2	b	180	b	0.0092	9.2	0.56
MW-13	Nov-99	5.3	<1.0	<1.0	7.25	<5.0	5.56	<1.0	<1.0	<1.0	<1.0	NA
	Apr-00	<1.0	<1.0	<1.0	1.86	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	NA
	Oct-00	<1.0	<5.0	<1.0	3.68	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	145
	Apr-01	d	d	d	d	d	d	d	d	d	d	198
	Oct-01	d	d	d	d	d	d	d	d	d	d	141
	Apr-02	d	d	d	d	d	d	d	d	d	d	<1.0
	Oct-02	d	d	d	d	d	d	d	d	d	d	7.44
	Apr-03	d	d	d	d	d	d	d	d	d	d	<4.00
	Oct-03	d	d	d	d	d	d	d	d	d	d	20/40
	Oct-03 (Dup)	d	d	d	d	d	d	d	d	d	d	37/70
	Apr-04	d	d	d	d	d	d	d	d	d	d	<1.0
	Apr-04 (Dup)	d	d	d	d	d	d	d	d	d	d	<1.0
	Oct-04	0.158	0.639	0.128	2.43	<0.10	0.143	0.102	<0.10	<0.10	<0.10	12.8

Table 2

Semivolatile Organic Compounds Detected in Groundwater

Linnton Oil Fire Training Grounds

Portland, Oregon

		Compound concentration in µg/L										
Well Number	Sample Date	Acenaphthene	Anthracene	Fluoranthene	Fluorene	Naphthalene	Phenanthrene	Pyrene	Benzo(a)anthracene	Benzo(a)pyrene	Chrysene	Pentachlorophenol
Cleanup Criteria	RBC	b	b	b	b	b	b	b	0.028 ^c	0.02 ^c	0.032 ^c	b
Screening Level Values	WQCS (acute/chronic)	1,700/520	b	3,980/NV	b	2,300/620	b	b	b	b	b	20/13
	MCL	b	b	b	b	b	b	b	b	0.2	b	1.00
	PRG	370	1800	1500	240	6.2	b	180	b	0.0092	9.2	0.56
MW-14	Nov-99	<0.1	<0.1	<0.1	<0.1	0.172	<0.1	<0.1	<0.1	<0.1	<0.1	NA
	Nov-99 (Dup)	<0.1	<0.1	<0.1	<0.1	0.22	<0.1	<0.1	<0.1	<0.1	<0.1	NA
	Apr-00	<0.1	<0.1	<0.1	0.148	0.793	0.151	<0.1	<0.1	<0.1	<0.1	NA
	Apr-00 (Dup)	<0.1	<0.1	<0.1	0.150	0.694	0.157	<0.1	<0.1	<0.1	<0.1	NA
	Oct-00	<0.1	<0.1	<0.1	<0.1	0.181	<0.1	<0.1	<0.1	<0.1	<0.1	3.62
	Apr-01	d	d	d	d	d	d	d	d	d	d	4.30 ^e
	Apr-01 (Dup)	d	d	d	d	d	d	d	d	d	d	4.24 ^e
	Oct-01	d	d	d	d	d	d	d	d	d	d	2.12
	Apr-02	d	d	d	d	d	d	d	d	d	d	2.48
	Oct-02	d	d	d	d	d	d	d	d	d	d	1.71
	Apr-03	d	d	d	d	d	d	d	d	d	d	1.09
	Oct-03	d	d	d	d	d	d	d	d	d	d	<1.00
	Apr-04	d	d	d	d	d	d	d	d	d	d	2.02
	Oct-04	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	1.73

Table 2

Semivolatile Organic Compounds; Polynuclear Aromatic Hydrocarbons Detected in Groundwater

Linnton Oil Fire Training Grounds

Portland, Oregon

Notes:


1. Samples analyzed by EPA Test Method 8270 SIM unless otherwise noted
 2. Only PAH compounds detected above method reporting limits are shown on Table 4
 3.  Shaded values designate concentrations that exceed RBC cleanup criteria or WQCS screening values
-
- a) Compound evaluated in AGI's RI/FS Endangerment Assessment
 - b) Cleanup criteria and/or screening level values not listed in documents cited
 - c) Cleanup criteria is less than the method reporting limit of 0.10 µg/L
 - d) Removed from the sampling schedule - COC concentrations < method reporting limits for two consecutive sampling events
 - e) Analyzed by EPA Method 8040 MOD
 - f) MW-10 replaced MW-4 as a compliance monitoring well starting with the April 2001 sampling event
 - g) MW-7 and MW-8 added to the compliance well network starting with the April 2002 sampling event - analyzed for PCP only
-
- < Indicates less than the method reporting limit
- NA Not analyzed
- Dup Duplicate Sample
- µg/L Micrograms per liter
- RBC Risk-based Concentrations From AGI's RI/FS Endangerment Assessment - Primary Cleanup Goal
- WQCS Water Quality Criteria Summary: Oregon acute and chronic freshwater aquatic life criteria - OAR 34-41 Table 20 and updated Tables 33A & C
- MCL EPA National Primary Drinking Water Regulations - Maximum Contaminant Level (MCL)
- PRG EPA Region 9 Preliminary Remediation Goals for tap water (generic screening tables - October 2004)
- NV No screening value listed

Table 3

Volatile Organic Compounds Detected in Groundwater

Linnton Oil Fire Training Grounds

Portland, Oregon

Well Number	Sample Date	Compounds (concentrations in µg/L)																				
		1,1,1-Trichloroethane (TCA)	1,1-Dichloroethane	1,1-Dichloroethene	1,2,4-Trimethylbenzene	1,2-Dichloroethane (EDC)	1,3,5-Trimethylbenzene	Benzene	Chloro-1,2-Dichloroethene	Ethylbenzene	Isopropylbenzene	m,p-Xylene	Naphthalene	n-Butylbenzene	n-Propylbenzene	o-Xylene	p-Isopropyltoluene	sec-Butylbenzene	Toluene	Total Xylenes	Trichloroethene (TCE)	Vinyl Chloride
Cleanup Criteria	RBC	b	b	0.39 ^c	b	b	b	8.2	b	b	b	b	b	b	b	b	b	b	b	b	b	0.13 ^c
Screening Level Values	WQCS acute/chronic	18,000 /NV	b	b	b	118,000 /20,000	b	5,300 /NV	b	32,000 /NV	b	b	2300 / 620	b	b	b	b	b	17,500 /NV	b	45,000 /21,900	b
	MCL	200	b	7.0	b	5.0	b	5.0	70	700	b	b	b	b	b	b	b	b	1000	10,000	5.0	2.0
	PRG	3200	810	340	12	0.12 ^c	12	b	61	1300	b	b	b	240	240	b	b	240	720	210	0.28	0.20
MW-1	Nov-99	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-	<1.0	<1.0
	Apr-00	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	4.52	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-	<1.0	<1.0
	Oct-00	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2.85	<1.0	<1.0	<2.0	<2.0	<2.0	<5.0	<1.0	<1.0	<2.0	<1.0	<1.0	-	<1.0	<1.0
	Oct-00 (Dup)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2.74	<1.0	<1.0	<2.0	<2.0	<2.0	<5.0	<1.0	<1.0	<2.0	<1.0	<1.0	-	<1.0	<1.0
	Apr-01	d	d	d	d	d	d	d	d	d	d	d	d	d	d	d	d	d	d	d	d	d
	Oct-04	<2.00	<1.00	<2.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<2.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<2.00	<1.00	<1.00

Table 03

Volatile Organic Compounds Detected in Groundwater
 Linnton Oil Fire Training Grounds
 Portland, Oregon

Well Number	Sample Date	Compound (concentrations in µg/L)																				
		1,1,1-Trichloroethane (TCA)	1,1-Dichloroethane	1,1,2-Dichloroethane	1,2,4-Trimethylbenzene	1,2-Dichloroethane (EDC)	1,3,5-Trimethylbenzene	Benzene	Chloro-1,2-Dichloroethane	Ethylbenzene	Isopropylbenzene	m,p-Xylene	Naphthalene	n-Butylbenzene	n-Propylbenzene	o-Xylene	p-Isopropyltoluene	sec-Butylbenzene	Toluene	Total Xylenes	Trichloroethene (PCE)	Vinyl Chloride
Cleanup Criteria	RBC	b	b	0.39 ^c	b	b	b	8.2	b	b	b	b	b	b	b	b	b	b	b	b	b	0.13 ^c
Screening Level Values	WQCS acute/chronic	18,000 /NV	b	b	b	118,000 /20,000	b	5,300 /NV	b	32,000 /NV	b	b	2300 / 620	b	b	b	b	b	17,500 /NV	b	45,000 /21,900	b
	MCL	200	b	7.0	b	5.0	b	5.0	70	700	b	b	b	b	b	b	b	b	1000	10,000	5.0	2.0
	PRG	3200	810	340	12	0.12 ^c	12	b	61	1300	b	b	b	240	240	b	b	240	720	210	0.28	0.20
MW-2	Jul-93	<0.5	<0.2	<0.2	g	<0.2	g	39	0.5	0.5	g	-	-	g	g	-	g	g	24	1100	<0.2	<1.0
	Dec-93	<0.5	<0.2	<0.2	g	<0.2	g	5.3	<0.2	14	g	-	-	g	g	-	g	g	1.2	25	<0.2	<1.0
	Dec-93 (Dup)	<0.5	<0.2	<0.2	g	<0.2	g	5.2	<0.2	14	g	-	-	g	g	-	g	g	1.4	24	<0.2	<1.0
	Nov-99	<1.0	<1.0	<1.0	110	<1.0	30.6	931	<1.0	18.1	51.1	71.9	20.9	9.5	104	<1.0	1.51	9.41	1.15	-	<1.0	<1.0
	Apr-00	<1.0	<1.0	<1.0	267	<1.0	59.7	452	<1.0	119	61.0	393	34.7	14.3	145	15.3	1.16	11.8	7.28	-	<1.0	<1.0
	Oct-00	<1.0	<1.0	<1.0	41.1	<1.0	18.8	6.49	<1.0	5.51	42.6	6.96	6.05	12.3	93.1	<1.0	<2.0	8.86	<1.0	-	<1.0	<1.0
	Apr-01	<1.0	<1.0	<1.0	149	<1.0	32	293	<1.0	102	50.8	208	74.9	17.3	126	7.51	<2.0	9.46	4.3	-	<1.0	<1.0
	Oct-01	<1.0	<1.0	<1.0	402	<1.0	3.99	5.02	<1.0	<1.0	34.2	<2.0	<2.0	9.97	73.1	<1.0	<2.0	8.78	<1.0	-	<1.0	<1.0
	Apr-02	<1.0	<1.0	<1.0	40.2	<1.0	11.50	510	<1.0	53.4	25.0	81.3	24.4	7.43	52.8	6.25	<2.0	6.06	5.08	-	<1.0	<1.0
	Oct-02	<1.0	<1.0	<1.0	32.9	<1.0	15.6	264	1.11	7.86	42.5	8.91	4.67	10.5	92.3	<1.0	<2.0	7.99	<1.0	-	<1.0	<1.0
	Apr-03	<1.0	<1.0	<1.0	13.2	<1.0	3.6	574	<1.0	19.8	29.0	11.3	10.1	8.86	59.5	<1.0	<2.0	8.40	2.45	-	<1.0	<1.0
	Apr-03 (Dup)	<1.0	<1.0	<1.0	12.7	<1.0	3.48	569	<1.0	19.5	27.1	11	10.2	8.51	55.1	<1.0	<2.0	7.64	2.88	-	<1.0	<1.0
	Oct-03	<1.0	<1.0	<1.0	217	<1.0	3.35	136	1.15	2.68	53.9	9.0	<2.00	12.40	117	1.38	<2.0	12.20	1.83	-	<1.0	<1.0
	Apr-04	<2.0	<2.0	<2.0	6.24	<2.0	3.58	679	<2.0	42	53.6	23.8	20.0	13.6	118	3.08	<4.0	9.82	5.42	-	<2.0	<2.0
	Oct-04	<2.00	<1.00	<2.00	<1.00	<1.00	2.0	235	2.3	3.1	49.2	<2.00	1.1	<1.00	73.6	<1.00	<1.00	10.0	1.1	<2.00	<1.00	<1.00

Table 03

Volatile Organic Compounds Detected in Groundwater

Linnton Oil Fire Training Grounds

Portland, Oregon

Well Number	Sample Date	Compound (concentrations in µg/L)																				
		1,1,1-Trichloroethane (TCA)	1,1-Dichloroethane	1,1-Dichloroethene	1,2,4-Trimethylbenzene	1,2-Dichloroethane (EDC)	1,3,5-Trimethylbenzene	Benzene	Chloro-1,2-Dichloroethene	Ethylbenzene	Isopropylbenzene	m,p-Xylene	Naphthalene	n-Butylbenzene	n-Propylbenzene	o-Xylene	p-Isopropyltoluene	sec-Butylbenzene	Toluene	Total Xylenes	Trichloroethene (TCE)	Vinyl Chloride
Cleanup Criteria	RBC	b	b	0.39 ^c	b	b	b	8.2	b	b	b	b	b	b	b	b	b	b	b	b	b	0.13 ^c
Screening Level Values	WQCS acute/chronic	18,000 /NV	b	b	b	118,000 /20,000	b	5,300 /NV	b	32,000 /NV	b	b	2300 / 620	b	b	b	b	b	17,500 /NV	b	45,000 /21,900	b
	MCL	200	b	7.0	b	5.0	b	5.0	70	700	b	b	b	b	b	b	b	b	1000	10,000	5.0	2.0
	PRG	3200	810	340	12	0.12 ^c	12	b	61	1300	b	b	b	240	240	b	b	240	720	210	0.28	0.20
MW-4	Oct-04	<2.00	<1.00	<2.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<2.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<2.00	<1.00	<1.00
MW-5	Nov-99	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<1.00	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-	<1.0	1.32
	Apr-00	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	1.56	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-	<1.0	1.45
	Oct-00	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.5	<1.0	<2.0	<2.0	<2.0	<5.0	<1.0	<1.0	<2.0	<1.0	<1.0	-	<1.0	1.13
	Apr-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<2.0	3.26	<5.0	<1.0	<1.0	<2.0	<1.0	<1.0	-	<1.0	<1.0
	Oct-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<2.0	<2.0	<5.0	<1.0	<1.0	<2.0	<1.0	<1.0	-	<1.0	3.00
	Apr-02	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<2.0	<2.0	<5.0	<1.0	<1.0	<2.0	<1.0	<1.0	-	<1.0	3.34
	Oct-02	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.58	<1.0	<2.0	<2.0	<2.0	<5.0	1.23	<1.0	<2.0	<1.0	<1.0	-	<1.0	12.8
	Oct-02 (Dup)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.62	<1.0	<2.0	<2.0	<2.0	<5.0	<1.0	<1.0	<2.0	<1.0	<1.0	-	<1.0	13.4
	Apr-03	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<2.0	<2.0	<5.0	<1.0	<1.0	<2.0	<1.0	<1.0	-	<1.0	1.81
	Oct-03	<1.0	<1.0	<1.0	1.56	<1.0	<1.0	<1.0	1.23	<1.0	<2.0	<2.0	<2.0	<5.0	<1.0	<1.0	<2.0	<1.0	<1.0	-	<1.0	9.16
	Apr-04	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<2.0	<2.0	<5.0	1.49	<1.0	<2.0	<1.0	<1.0	-	<1.0	2.4
	Oct-04	<2.00	<1.00	<2.00	<1.00	<1.00	<1.00	<1.00	2.6	<1.00	<1.00	<2.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<2.00	<1.00	3.3
Oct-04 (Dup)	<2.00	<1.00	<2.00	<1.00	<1.00	<1.00	<1.00	2.7	<1.00	<1.00	<2.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<2.00	<1.00	3.0	
MW-7	Oct-04	<2.00	<1.00	<2.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<2.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<2.00	<1.00	<1.00

Table 3

Volatile Organic Compounds Detected in Groundwater

Linnton Oil Fire Training Grounds

Portland, Oregon

Well Number	Sample Date	Compound (concentrations in µg/L)																				
		1,1,1-Trichloroethane (TCE)	1,1-Dichloroethane	1,1-Dichloro-ethene	1,2,4-Trimethylbenzene	1,2-Dichloroethane (DCE)	1,3,5-Trimethylbenzene	Benzene	Chlorobenzene	Ethylbenzene	Isopropylbenzene	m,p-Xylene	Naphthalene	n-Butylbenzene	n-Propylbenzene	o-Xylene	p-Isopropyltoluene	sec-Butylbenzene	Toluene	Total Xylenes	Trichloroethene (TCE)	Vinyl Chloride
Cleanup Criteria	RBC	b	b	0.39 ^c	b	b	b	8.2	b	b	b	b	b	b	b	b	b	b	b	b	b	0.13 ^c
Screening Levels Values	WQCS acute/chronic	18,000 /NV	b	b	b	118,000 /20,000	b	5,300 /NV	b	32,000 /NV	b	b	2300 / 620	b	b	b	b	b	17,500 /NV	b	45,000 /21,900	b
	MCL	200	b	7.0	b	5.0	b	5.0	70	700	b	b	b	b	b	b	b	b	1000	10,000	5.0	2.0
	PRG	3200	810	340	12	0.12 ^c	12	b	61	1300	b	b	b	240	240	b	b	240	720	210	0.28	0.20
MW-8	Oct-04	<2.00	<1.00	<2.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<2.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<2.00	<1.00	<1.00
MW-9	Nov-99	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-	<1.0	<1.0
	Apr-00	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-	<1.0	<1.0
	Oct-00	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.05	<1.0	<2.0	<2.0	<2.0	<5.0	<1.0	<1.0	<2.0	<1.0	<1.0	-	<1.0	<1.0
	Apr-01	d	d	d	d	d	d	d	d	d	d	d	d	d	d	d	d	d	d	-	d	d
	Oct-04	<2.00	<1.00	<2.00	<1.00	<1.00	<1.00	<1.00	2.2	<1.00	<1.00	<2.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<2.00	<1.00	<1.00
MW-10 ^f	Dec-93	<0.5	<0.2	<0.2	g	<0.2	g	<0.5	<0.2	<0.5	g	-	-	g	g	-	g	g	<0.5	<0.5	<0.2	<1.0
	Apr-01	<1.0	<1.0	<1.0	<1.0	1.11	<1.0	<1.0	<1.0	<1.0	<2.0	<2.0	<2.0	<5.0	<1.0	<1.0	<2.0	<1.0	<1.0	-	<1.0	<1.0
	Oct-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<2.0	<2.0	<5.0	<1.0	<1.0	<2.0	<1.0	<1.0	-	<1.0	<1.0
	Apr-02	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<2.0	<2.0	<5.0	<1.0	<1.0	<2.0	<1.0	<1.0	-	<1.0	<1.0
	Oct-02	d	d	d	d	d	d	d	d	d	d	d	d	d	d	d	d	d	d	-	d	d
	Oct-04	<2.00	<1.00	<2.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<2.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<2.00	<1.00	<1.00
MW-11	Oct-04	<2.00	<1.00	<2.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<2.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<2.00	<1.00	<1.00
MW-12	Oct-04	<2.00	<1.00	<2.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<2.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<2.00	<1.00	<1.00

Table 3

Volatile Organic Compounds Detected in Groundwater

Linnton Oil Fire Training Grounds

Portland, Oregon

Well Number	Sample Date	Compound (concentrations in µg/L)																				
		1,1,1-Trichloroethane (TCA)	1,1-Dichloroethane	1,1-Dichloroethene	1,2,4-Trimethylbenzene	1,2-Dichloroethane (EDC)	1,3,5-Trimethylbenzene	Benzene ^a	Chloro-1,2-Dichloroethene	Ethylbenzene	Isopropylbenzene	m,p-Xylene	Naphthalene	n-Butylbenzene	n-Propylbenzene	o-Xylene	p-Isopropyltoluene	sec-Butylbenzene	Toluene	Total Xylenes	Trichloroethene (TCE)	Vinyl Chloride
Cleanup Criteria	RBC	b	b	0.39 ^c	b	b	b	8.2	b	b	b	b	b	b	b	b	b	b	b	b	b	0.13 ^c
Screening Level Values	WQCS acute/chronic	18,000 /NV	b	b	b	118,000 /20,000	b	5,300 /NV	b	32,000 /NV	b	b	2300 / 620	b	b	b	b	b	17,500 /NV	b	45,000 /21,900	b
	MCL	200	b	7.0	b	5.0	b	5.0	70	700	b	b	b	b	b	b	b	b	1000	10,000	5.0	2.0
	PRG	3200	810	340	12	0.12 ^c	12	b	61	1300	b	b	b	240	240	b	b	240	720	210	0.28	0.20
MW-13	Nov-99	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	3.17	4.32	2.69	1.74	<2.0	1.06	1.46	3.76	2.68	<1.0	1.17	<1.0	-	<1.0	8.08 ^a
	Apr-00	<1.0	1.28	<1.0	1.49	1.30	<1.0	7.79 ^h	14.4	1.32	<1.0	<2.0	<1.0	<1.0	<1.0	4.68	<1.0	<1.0	<1.0	-	3.16	33.5 ^a
	Oct-00	<1.0	1.04	<1.0	<1.0	1.25	<1.0	6.01 ^h	15.1	<1.0	<2.0	<2.0	<2.0	<5.0	<1.0	2.13	<2.0	<1.0	<1.0	-	3.48	24.2 ^a
	Apr-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	5.24 ^h	12.5	<1.0	<2.0	<2.0	<2.0	<5.0	<1.0	1.02	<2.0	<1.0	<1.0	-	3.14	21.7 ^a
	Oct-01	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	5.08 ^h	12.7	<1.0	<2.0	<2.0	<2.0	<5.0	<1.0	<1.0	<2.0	<1.0	<1.0	-	3.65	21.2 ^a
	Apr-02	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	3.33	2.12	1.36	<2.0	<2.0	<2.0	<5.0	3.13	1.32	<2.0	<1.0	<1.0	-	<1.0	<1.0
	Oct-02	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	3.28	4.63	<1.0	<2.0	<2.0	<2.0	<5.0	<1.0	<1.0	<2.0	<1.0	<1.0	-	1.1	9.9 ^a
	Apr-03	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2.19	1.56	<1.0	<2.0	<2.0	<2.0	<5.0	2.01	<1.0	<2.0	<1.0	<1.0	-	<1.0	2.53 ^a
	Oct-03	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	3.1	7.3	<1.0	<2.0	<2.0	<2.0	<5.0	<1.0	<1.0	<2.0	1.86	<1.0	-	2.74	13.7 ^a
	Oct-03 (Dup)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2.74	6.4	<1.0	<2.0	<2.0	<2.0	<5.0	<1.0	<1.0	<2.0	1.81	<1.0	-	2.38	12.8 ^a
	Apr-04	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.79	<1.0	<1.0	<2.0	<2.0	<2.0	<5.0	2.72	<1.0	<2.0	<1.0	<1.0	-	<1.0	<1.0
	Apr-04 (Dup)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.82	<1.0	<1.0	<2.0	<2.0	<2.0	<5.0	2.72	<1.0	<2.0	<1.0	<1.0	-	<1.0	<1.0
	Oct-04	<2.00	<1.00	<2.00	<1.00	<1.00	<1.00	2.4	5.0	<1.00	<1.00	<2.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<2.00	2.5	3.6 ^a

Table 3

Volatile Organic Compounds Detected in Groundwater
 Linnton Oil Fire Training Grounds
 Portland, Oregon

Well Number	Sample Date	Compound (Concentrations in µg/L)																				
		1,1,1-Trichloroethane (TCA)	1,1-Dichloroethane	1,1-Dichloroethene	1,2,4-Trimethylbenzene	1,2-Dichloroethane (EDC)	1,3,5-Trimethylbenzene	Benzene	Chlorobenzene	Ethylbenzene	Isopropylbenzene	m,p-Xylene	Naphthalene	n-Butylbenzene	n-Propylbenzene	o-Xylene	p-Isopropyltoluene	sec-Butylbenzene	Toluene	Total Xylenes	Trichloroethene (TCE)	Vinyl Chloride
Cleanup Criteria	RBC	b	b	0.39 ^c	b	b	b	8.2	b	b	b	b	b	b	b	b	b	b	b	b	b	0.13 ^c
Screening Level Values	WQCS acute/chronic	18,000 /NV	b	b	b	118,000 /20,000	b	5,300 /NV	b	32,000 /NV	b	b	2300 / 620	b	b	b	b	b	17,500 /NV	b	45,000 /21,900	b
	MCL	200	b	7.0	b	5.0	b	5.0	70	700	b	b	b	b	b	b	b	b	1000	10,000	5.0	2.0
	PRG	3200	810	340	12	0.12 ^c	12	b	61	1300	b	b	b	240	240	b	b	240	720	210	0.28	0.20
MW-14	Nov-99	141	8.11	149	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-	<1.0	<1.0
	Nov-99 (Dup)	145	8.52	154	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-	<1.0	<1.0
	Apr-00	125	3.01	109	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-	<1.0	<1.0
	Apr-00 (Dup)	131	3.1	111	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-	<1.0	<1.0
	Oct-00	21.4	4.24	202	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<2.0	<2.0	<5.0	<1.0	<1.0	<2.0	<1.0	<1.0	-	<1.0	<1.0
	Apr-01	105	10.8	107	<1.0	7.67	<1.0	<1.0	<1.0	<1.0	<2.0	<2.0	<2.0	<5.0	<1.0	<1.0	<2.0	<1.0	<1.0	-	<1.0	<1.0
	Apr-01 (Dup)	105	10.9	102	<1.0	7.57	<1.0	<1.0	<1.0	<1.0	<2.0	<2.0	<2.0	<5.0	<1.0	<1.0	<2.0	<1.0	<1.0	-	<1.0	<1.0
	Oct-01	65.6	15.4	775	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<2.0	<2.0	<5.0	<1.0	<1.0	<2.0	<1.0	<1.0	-	<1.0	<1.0
	Apr-02	45.8	3.32	362	<1.0	3.44	<1.0	<1.0	<1.0	<1.0	<2.0	<2.0	<2.0	<5.0	<1.0	<1.0	<2.0	<1.0	<1.0	-	<1.0	<1.0
	Oct-02	71.6	17.0	626	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<2.0	<2.0	<5.0	<1.0	<1.0	<2.0	<1.0	<1.0	-	<1.0	<1.0
	Apr-03	5.82	1.79	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<2.0	<2.0	<5.0	<1.0	<1.0	<2.0	<1.0	<1.0	-	<1.0	<1.0
	Oct-03	113	28.4	826	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<2.0	<2.0	<5.0	<1.0	<1.0	<2.0	<1.0	<1.0	-	<1.0	<1.0
	Apr-04	113	10.1	716	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<2.0	<2.0	<5.0	<1.0	<1.0	<2.0	<1.0	<1.0	-	<1.0	<1.0
	Oct-04	70.4	26.1	4.7	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<2.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<2.00	<1.00	<1.00


Table 3

Volatile Organic Compounds Detected in Groundwater

Linnton Oil Fire Training Grounds

Portland, Oregon

Notes:

1. Samples analyzed by EPA Method 8260 B
 2. Only VOC compounds detected above method reporting limits are shown on Table 5
 3.  Shaded values designate concentrations that exceed RBC cleanup criteria or WQCS screening values.
-
- a) Compound evaluated in AGI's RI/FS Endangerment Assessment
 - b) Cleanup criteria and/or screening level values not listed in documents cited
 - c) Cleanup criteria is less than the method reporting limit
 - d) Removed from the sampling schedule - COC concentrations < method reporting limits for two consecutive sampling events
 - e) Also included in Table 4 (PAHs Detected in Groundwater) as a test parameter
 - f) MW-10 replaced MW-4 as a compliance monitoring well starting with the April 2001 sampling event
 - g) Compound not included as a parameter in previous analytical method used

< Indicates less than the method reporting limit

Dup Duplicate Sample

µg/L Micrograms per liter

RBC Risk-based Concentrations From AGI's RI/FS Endangerment Assessment - Primary Cleanup Goal

WQCS OR Water Quality Criteria Summary: 1st value represents acute & 2nd value chronic freshwater aquatic life criteria - OAR Table 20 & updated Tables 33A & C

MCL EPA National Primary Drinking Water Regulations - Maximum Contaminant Level (MCL)

PRG EPA Region 9 Preliminary Remediation Goals for tap water (generic screening tables - 11-22-00)

NV No screening value listed

Table 4

Dissolved Arsenic Detected in Groundwater
 Linnton Oil Fire Training Grounds
 Portland, Oregon

Well Number	Sample Date	Arsenic		Comparison Cleanup Criteria For Dissolved Arsenic	
		Dissolved (µg/L)	Total (µg/L)	RBC µg/L	MCL µg/L
MW-1	Jul-93	28.0	NA	0.14	10
	Dec-93	12.0	18.0		
	Nov-99	17.5	20.3		
	Apr-00	12.4	7.1		
	Oct-00	33.1	132.0		
	Oct-00 (Duplicate)	32.6	78.8		
	Apr-01	16.8	26.9		
	Oct-01	24.6	42.8		
	Apr-02	6.7	10.2		
	Oct-02	19.8	29.5		
	Apr-03	11.4	31.0		
	Oct-03	15.9	22.7		
	Apr-04	7.5	23.3		
	Oct-04	22.7	33.8		
MW-2	Jul-93	87.0	NA		
	Dec-93	65.0	95.0		
	Dec-93 (Duplicate)	69.0	78.0		
	Nov-99	74.4	81.5		
	Apr-00	51.7	65.9		
	Oct-00	99.8	106.0		
	Apr-01	62.6	101.0		
	Oct-01	76.4	142.0		
	Apr-02	58.2	60.7		
	Oct-02	70.0	115.0		
	Apr-03	24.8	54.3		
	Apr-03 (Duplicate)	22.2	56.6		
	Oct-03	39.8	107.0		
	Apr-04	34.2	68.8		
	Oct-04	78.3	99.5		
MW-4	Oct-04	0.66	4.73		

Table 4

Dissolved Arsenic Detected in Groundwater

Linnton Oil Fire Training Grounds

Portland, Oregon

Well Number	Sample Date	Arsenic		Comparison Cleanup Criteria for Dissolved Arsenic	
		Dissolved (µg/L)	Total (µg/L)	RBC (µg/L)	MCL (µg/L)
MW-5	Dec-93	7.0	25.0	0.14	10
	Nov-99	18.4	26.2		
	Apr-00	23.5	25.4		
	Oct-00	26.6	50.2		
	Apr-01	23.9	25.3		
	Oct-01	15.3	46.4		
	Oct-01 (Duplicate)	15.4	44.1		
	Apr-02	36.4	36.5		
	Oct-02	21.6	50.4		
	Oct-02 (Duplicate)	18.2	38.0		
	Apr-03	18.9	34.6		
	Oct-03	12.7	27.8		
	Apr-04	17.8	31.5		
	Oct-04	18.8	25.5		
	Oct-04 (Duplicate)	26.7	28.0		
MW-7	Oct-04	0.73	5.56		
MW-8	Oct-04	2.62	6.42		
MW-9	Jul-93	5.0	NA		
	Dec-93	<5	15.0		
	Nov-99	14.7	23.6		
	Apr-00	7.0	10.2		
	Oct-00	7.8	9.7		
	Apr-01	6.64	8.1		
	Oct-01	4.9	7.1		
	Apr-02	11.8	15.0		
	Apr-02 (Duplicate)	11.9	13.8		
	Oct-02	5.54	7.22		
	Apr-03	1.49	1.94		
	Oct-03	4.47	7.29		
	Apr-04	6.44	14.60		
	Oct-04	8.75	8.95		

Table 4

Dissolved Arsenic Detected in Groundwater
 Linnton Oil Fire Training Grounds
 Portland, Oregon

Well Number	Sample Date	Arsenic		Comparison/Cleanup Criteria for Dissolved Arsenic	
		Dissolved (µg/L)	Total (µg/L)	RBC µg/L	MCL µg/L
MW-10	Dec-93	<5	11.0	0.14	10
	Apr-01	1.58	2.8		
	Oct-01	1.60	4.1		
	Apr-02	1.54	1.9		
	Oct-02	1.80	2.35		
	Apr-03	3.35	6.67		
	Oct-03	2.00	2.65		
	Apr-04	1.55	1.98		
	Oct-04	1.97	2.84		
MW-11	Oct-04	0.98	12.50		
MW-12	Oct-04	0.73	2.79		
MW-13	Nov-99	31.0	90.8		
	Apr-00	67.4	124.0		
	Oct-00	97.4	156.0		
	Apr-01	66.8	79.1		
	Oct-01	112.0	147.0		
	Apr-02	42.3	55.0		
	Oct-02	60.8	126.0		
	Apr-03	14.3	55.6		
	Oct-03	26.3	88.2		
	Oct-03 (Duplicate)	27.2	88.1		
	Apr-04	13.4	41.9		
	Apr-04 (Duplicate)	15.3	43.2		
	Oct-04	70.4	97.2		

Table 4

Dissolved Arsenic Detected in Groundwater
 Linnton Oil Fire Training Grounds
 Portland, Oregon

Well Number	Sample Date	Arsenic		Comparison Cleanup Criteria For Dissolved Arsenic	
		Dissolved ($\mu\text{g/L}$)	Total ($\mu\text{g/L}$)	RBC ($\mu\text{g/L}$)	MCL ($\mu\text{g/L}$)
MW-14	Nov-99	0.95	6.53	0.14	10
	Nov-99 (Duplicate)	0.89	6.12		
	Apr-00	1.56	2.43		
	Apr-00 (Duplicate)	1.51	2.16		
	Oct-00	2.65	12.6		
	Apr-01	0.74	1.73		
	Apr-01 (Duplicate)	0.63	1.58		
	Oct-01	1.60	4.01		
	Apr-02	0.44	1.81		
	Oct-02	0.76	2.48		
	Apr-03	0.63	1.08		
	Oct-04	1.21	3.04		
	Apr-04	0.31	0.53		
	Oct-04	1.72	4.02		

Notes:

Test Method - Samples analyzed by EPA Method 200.8

< Indicates less than the method reporting limit

$\mu\text{g/L}$ Micrograms per liter

NA Not analyzed

RBC Risk-based Concentrations From AGI's RI/FS - Primary Cleanup Goals

MCL Federal Drinking Water Standard Maximum Contaminant Level included for comparison.

Revised to 10 $\mu\text{g/L}$ in 2001

Table 5- Soil Data

Soil Sampling 11/14/02 (continued)	Sample Location				DEQ Level II Screening Level	DEQ Risk- Based Concentrations	EPA Preliminary Remediation Goals
Test Parameter	SOIL1 (ug/kg)	SOIL2 (ug/kg)	SOIL3 (ug/kg)	SOIL4 (ug/kg)	Most Stringent (ug/kg)	Residential Soil (ug/kg)	Residential Soil (ug/kg)
Acenaphthylene	<MRL	35.3	83.2	81.6	n/a	n/a	n/a
Anthracene	540	124	220	102	n/a	21,000,000	n/a
Benzo(a)anthracene	187	254	593	611	n/a	620	n/a
Benzo(a)pyrene	187	528	1230	1340	n/a	62	n/a
Benzo(b)fluoranthene	275	384	824	1020	n/a	620	n/a
Benzo(ghi)perylene	491	798	1710	2060	n/a	n/a	n/a
Benzo(k)fluoranthene	530	345	787	808	n/a	6,200	n/a
Chrysene	226	314	736	821	n/a	62,000	n/a
Dibenzo(a,h)anthracene	<MRL	76.9	237	262	n/a	62	n/a
Flouranthene	216	361	890	938	n/a	2,300,000	n/a
Fluorene	<MRL	<MRL	21.0	24.9	30,000	2,600,000	n/a
Indeno(1,2,3-cd)pyrene	<MRL	635	1450	1650	n/a	620	n/a
Naphthalene	<MRL	24.6	52.1	55.5	10,000	34,000	n/a
Pentachlorophenol	6870	770	788	386	3,000	n/a	3,000
Phenanthrene	<MRL	183	396	431	n/a	n/a	n/a
Pyrene	481	588	1160	1240	n/a	1,700,000	n/a

MRL = Method Reporting Limit. For individual MRL values, refer to Laboratory Analysis Reports.

Soil Sampling 11/7/03	Sample Location						DEQ Level II Screening Level	DEQ Risk- Based Concentrations	EPA Preliminary Remediation Goals
Test Parameter	LOFTG1 (ug/kg)	LOFTG5 (ug/kg)	LOFTG6 (ug/kg)	LOFTG7 (ug/kg)	LOFTG8 (ug/kg)	LOFTG9 (ug/kg)	Most Stringent (ug/kg)	Residential Soil (ug/kg)	Residential Soil (ug/kg)
Acenaphthene	<MRL	<MRL	<MRL	<MRL	<MRL	<MRL	20,000	2,900,000	n/a
Acenaphthylene	<MRL	<MRL	32.2	68.4	<MRL	<MRL	n/a	n/a	n/a
Anthracene	<MRL	<MRL	97.0	113	<MRL	<MRL	n/a	21,000,000	n/a
Benzo(a)anthracene	<MRL	13.4	56.9	274	13.4	<MRL	n/a	620	n/a
Benzo(a)pyrene	18.7	20.4	80.7	653	<MRL	<MRL	n/a	62	n/a
Benzo(b)fluoranthene	15.2	16.2	76.1	464	<MRL	<MRL	n/a	620	n/a
Benzo(ghi)perylene	23.8	20.1	245	1110	<MRL	<MRL	n/a	n/a	n/a
Benzo(k)fluoranthene	<MRL	<MRL	59.7	420	<MRL	<MRL	n/a	6,200	n/a
Chrysene	14.4	17.4	77.0	404	<MRL	<MRL	n/a	62,000	n/a
Dibenzo(a,h)anthracene	<MRL	<MRL	<MRL	133	<MRL	<MRL	n/a	62	n/a
Flouranthene	21.0	24.8	90.2	372	<MRL	<MRL	n/a	2,300,000	n/a
Fluorene	<MRL	<MRL	<MRL	<MRL	<MRL	<MRL	30,000	2,600,000	n/a
Indeno(1,2,3-cd)pyrene	16.2	14.2	173	759	<MRL	<MRL	n/a	620	n/a
Naphthalene	<MRL	<MRL	<MRL	<MRL	<MRL	<MRL	10,000	34,000	n/a
Pentachlorophenol	67.5	<MRL	1080	858	<MRL	<MRL	3,000	n/a	3,000
Phenanthrene	<MRL	<MRL	64.1	159	<MRL	<MRL	n/a	n/a	n/a
Pyrene	27.8	34.0	125	535	<MRL	14.3	n/a	1,700,000	n/a

MRL = Method Reporting Limit. For individual MRL values, refer to Laboratory Analysis Reports.

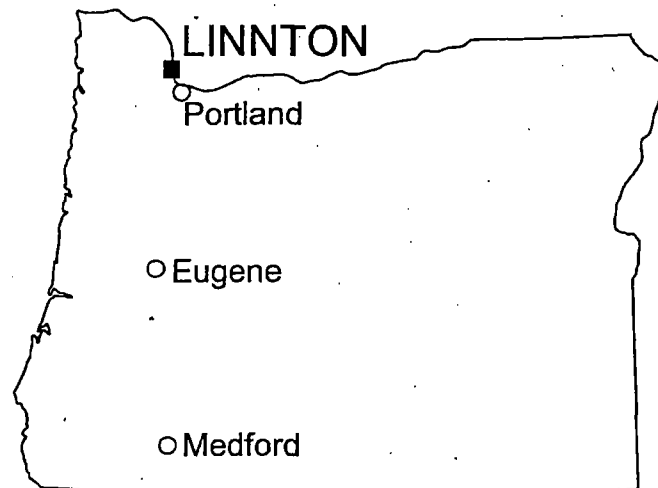
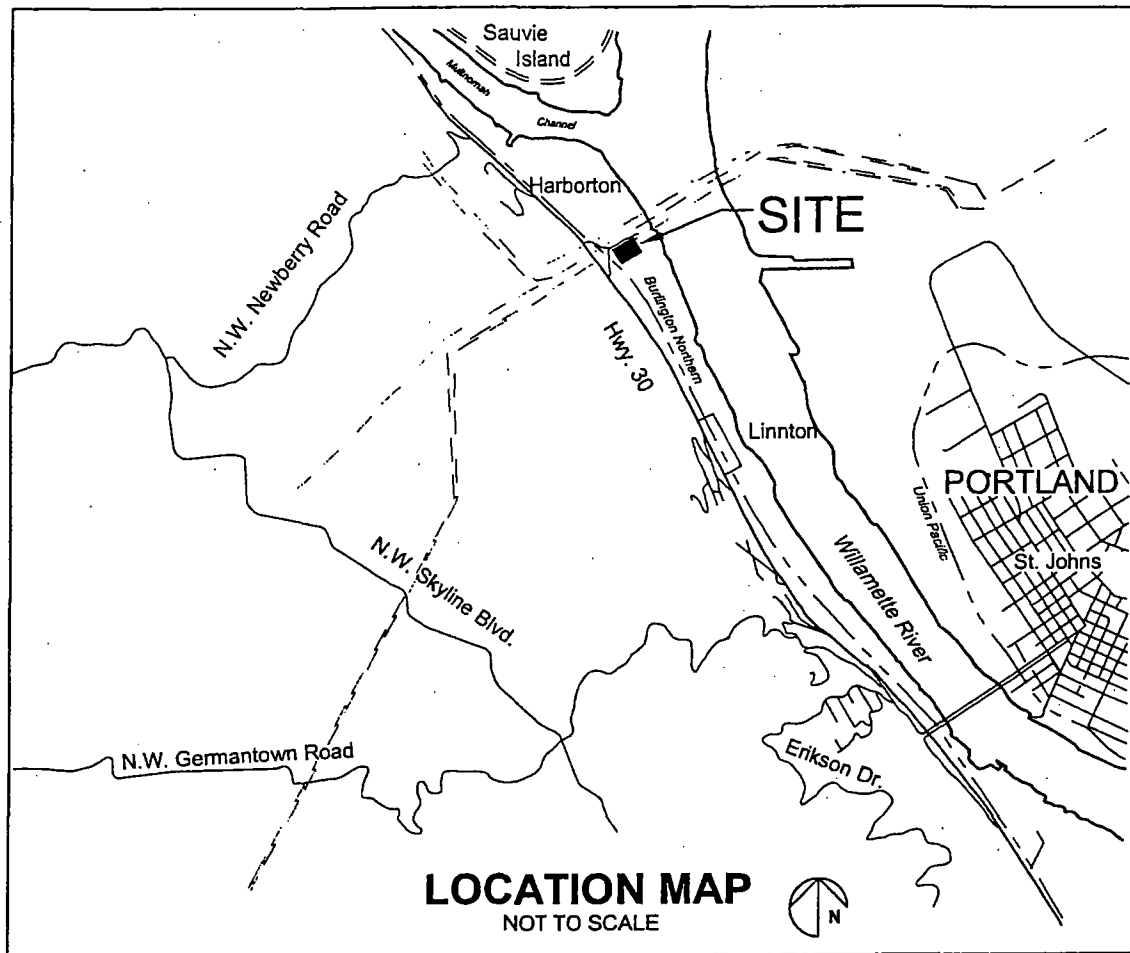
Table-5

Soil Sampling 6/30/04	Sample Location						DEQ Level II Screening Level	Consensus Based Probable Effect Concentration	DEQ Risk-Based Concentration
Test Parameter	LOFTG10 (mg/kg)	LOFTG11 (mg/kg)	LOFTG12A (mg/kg)	LOFTG12B (mg/kg)	LOFTG13 (mg/kg)	LOFTG14 (mg/kg)	Most Stringent (mg/kg)	MacDonald, et al, 2000 (mg/kg)	Residential Soil (mg/kg)
Pentachlorophenol	<0.067	<0.067	<0.067	<0.134	<0.067	<0.067	3	1*	n/a
Acenaphthene	<0.0134	<0.0134	<0.0134	<0.268	<0.0134	<0.0134	20	n/a	2,900
Acenaphthylene	<0.0134	<0.0134	<0.0134	<0.268	<0.0134	<0.0134	n/a	n/a	n/a
Anthracene	<0.0134	<0.0134	<0.0134	<0.268	<0.0134	<0.0134	n/a	0.845	21,000
Benzo(a)anthracene	<0.0134	<0.0134	<0.0134	0.113	<0.0134	<0.0134	n/a	1.05	0.620
Benzo(a)pyrene	<0.0134	<0.0134	<0.0134	0.163	<0.0134	<0.0134	125	1.45	0.062
Benzo(b)fluoranthene	<0.0134	<0.0134	<0.0134	0.111	<0.0134	<0.0134	n/a	n/a	0.620
Benzo(ghi)perylene	<0.0134	<0.0134	<0.0134	0.139	<0.0134	<0.0134	n/a	n/a	n/a
Benzo(k)fluoranthene	<0.0134	<0.0134	<0.0134	0.116	<0.0134	<0.0134	n/a	n/a	6.2
Chrysene	<0.0134	<0.0134	<0.0134	0.134	<0.0134	<0.0134	n/a	1.29	62
Dibenzo(a,h)anthracene	<0.0134	<0.0134	<0.0134	<0.268	<0.0134	<0.0134	n/a	n/a	0.062
Fluoranthene	<0.0134	<0.0134	<0.0134	0.181	<0.0134	<0.0134	n/a	2.23	2,300
Fluorene	<0.0134	<0.0134	<0.0134	<0.268	<0.0134	<0.0134	30	0.536	2,600
Indeno(1,2,3-cd)pyrene	<0.0134	<0.0134	<0.0134	0.106	<0.0134	<0.0134	n/a	n/a	0.62
Naphthalene	<0.0134	<0.0134	<0.0134	<0.268	<0.0134	<0.0134	10	0.561	34
Phenanthrene	<0.0134	<0.0134	<0.0134	<0.268	<0.0134	<0.0134	n/a	1.17	n/a
Pyrene	<0.0134	<0.0134	<0.0134	0.239	<0.0134	<0.0134	n/a	1.52	1,700
Total PAHs	n/a	n/a	n/a	1.189	n/a	n/a	n/a	22.8	n/a

n/a = not available

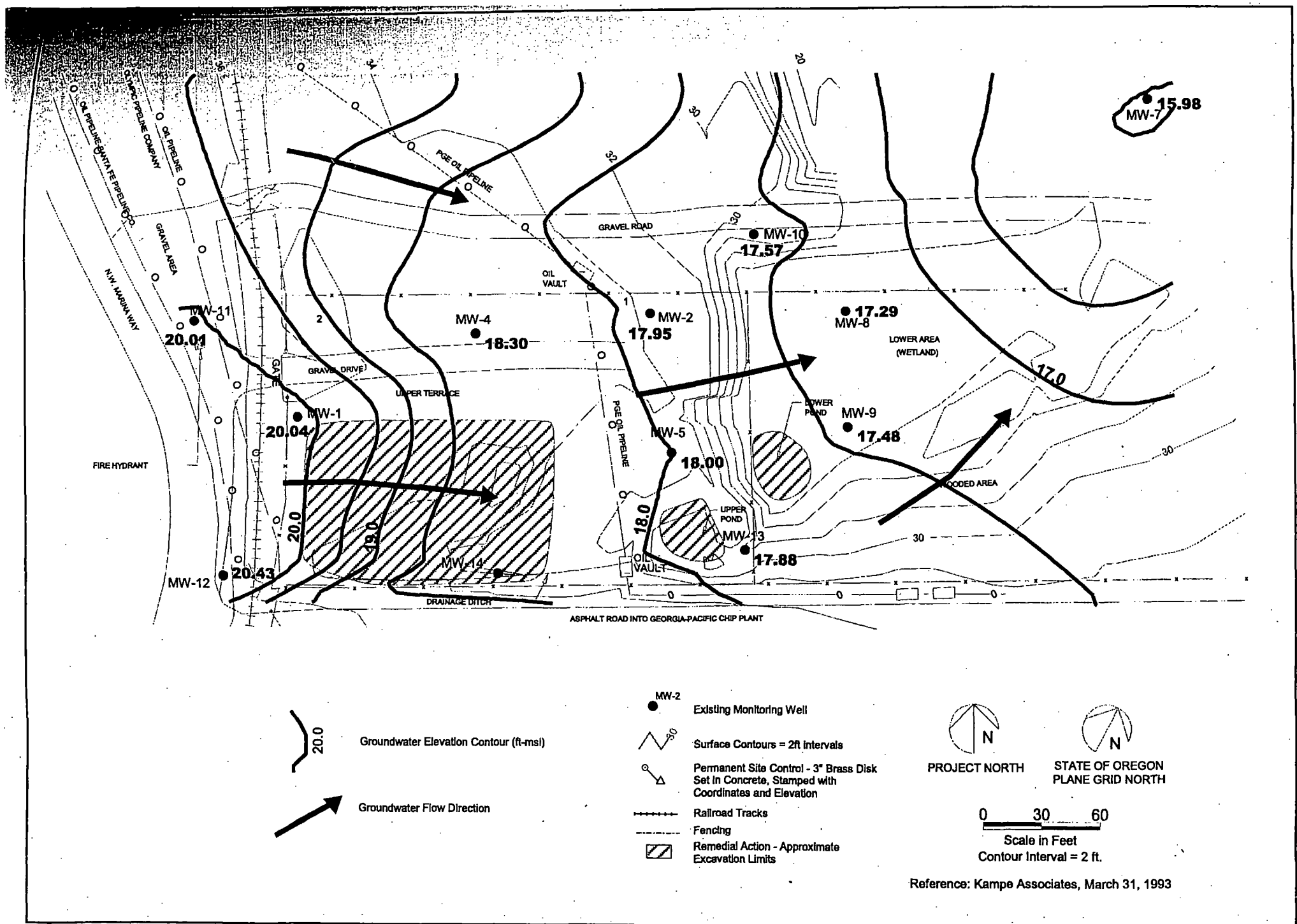
* = screening level recommended by Jennifer Peterson of DEQ.

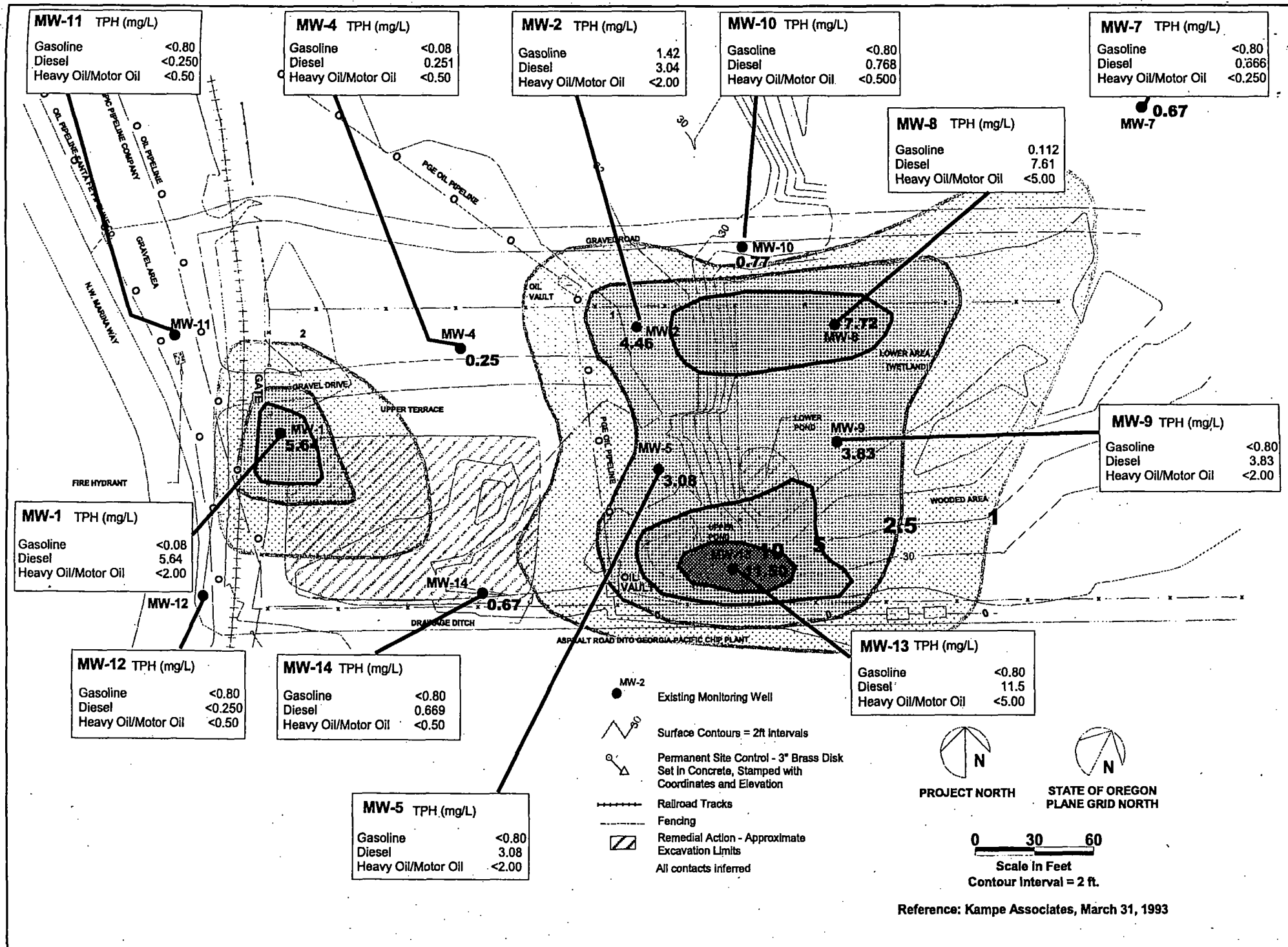
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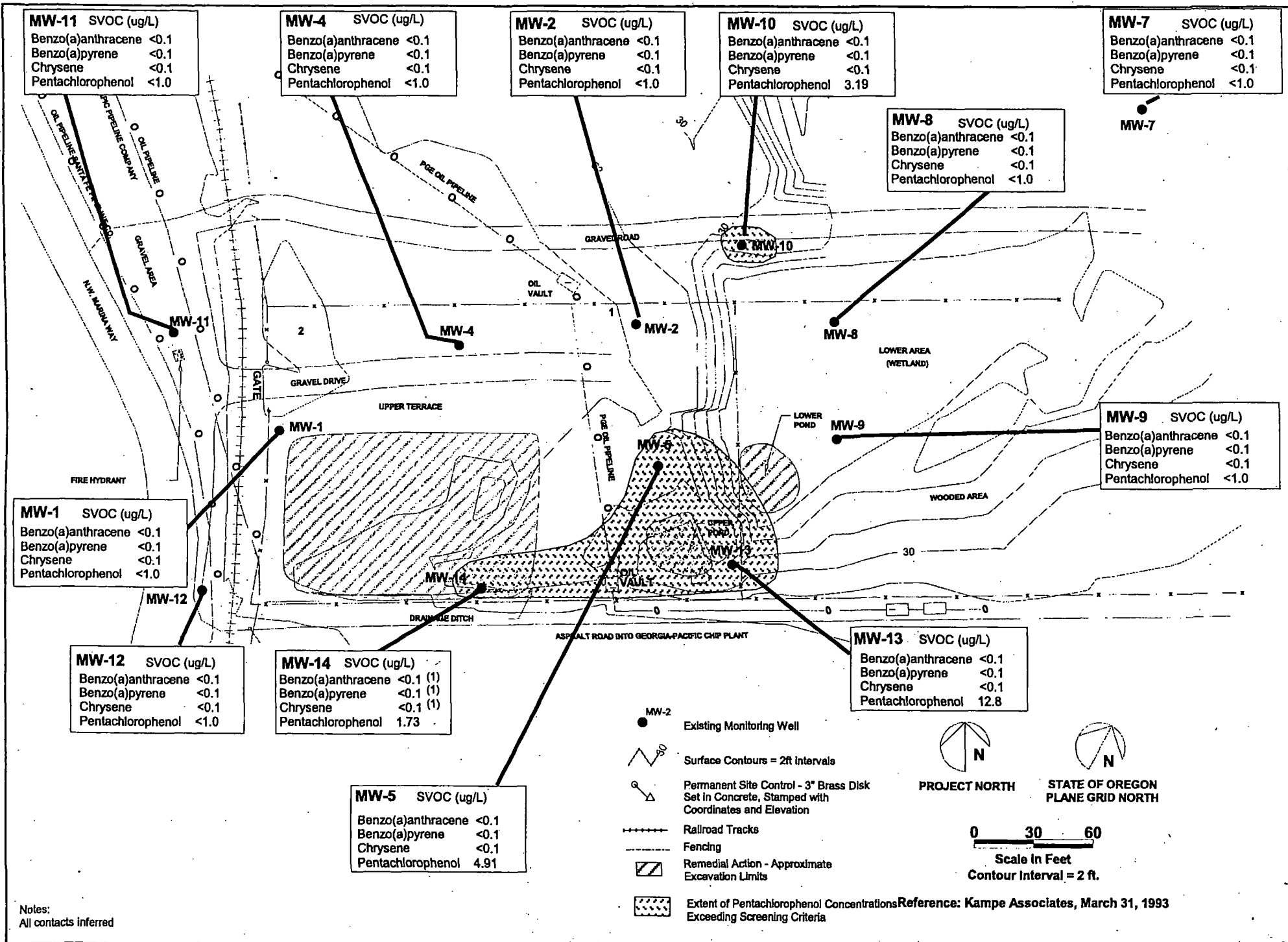


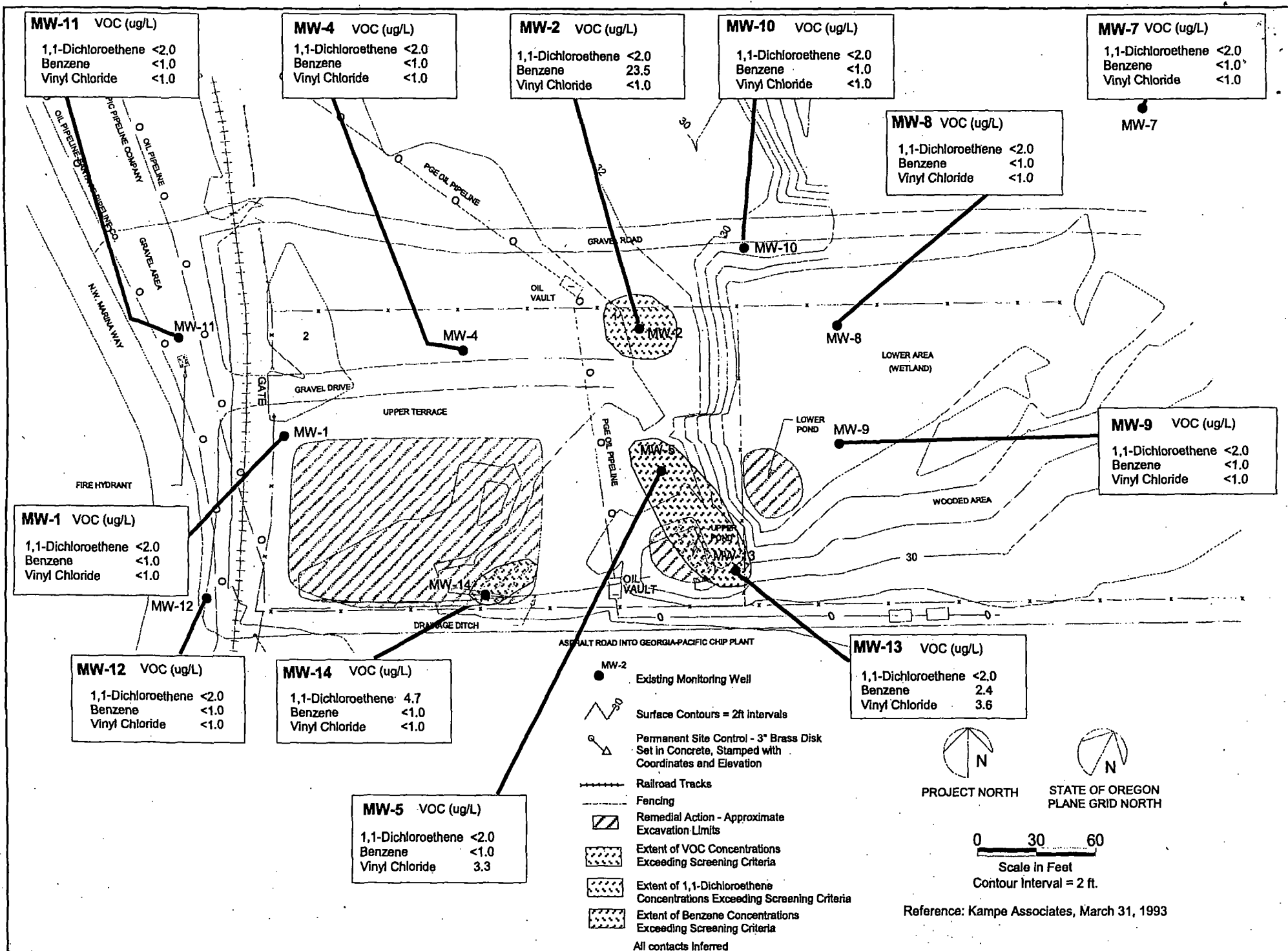
CITY OF PORTLAND BUREAU OF FIRE, RESCUE, &
EMERGENCY SERVICES / LINNTON
PORTLAND, OREGON

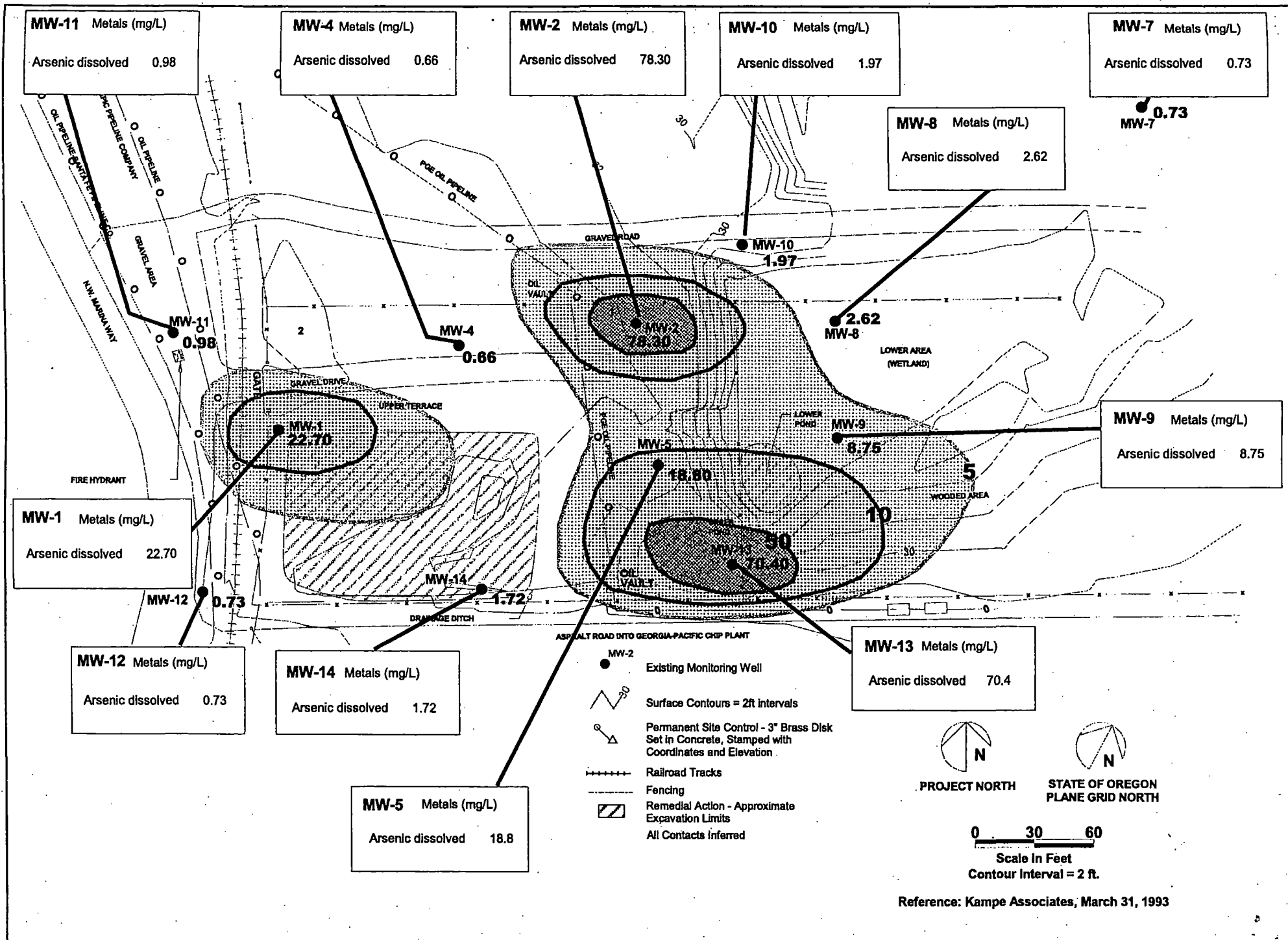
FIGURE 1
LOCATION MAP











Linnton Oil Fire Training Grounds Soil Samples

☆ November 14, 2002

△ November 7, 2003

⊙ June 30, 2004

Figure 7

